

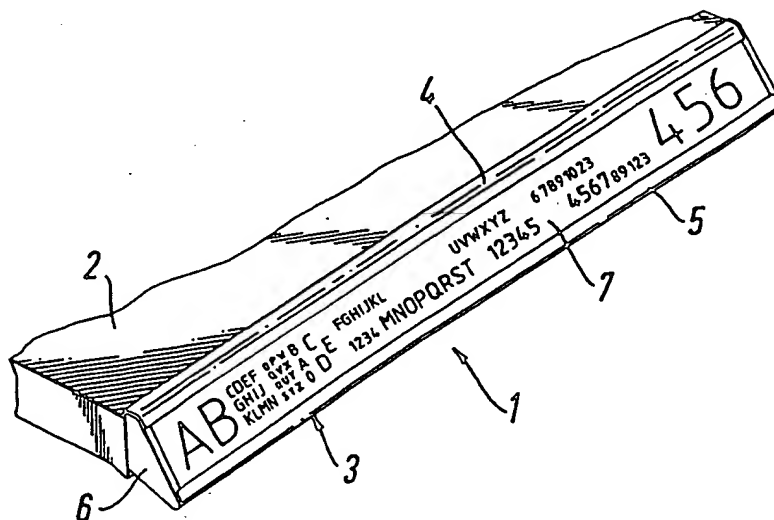
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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/GB91/02038 <b>(22) International Filing Date:</b> 18 November 1991 (18.11.91) <b>(30) Priority data:</b> 9025017.6                      16 November 1990 (16.11.90) GB <b>(71) Applicant (for all designated States except US):</b> CLARES EQUIPMENT LIMITED [GB/GB]; Parkwood Estate, Wells, Somerset BA5 1UT (GB). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only) :</b> GRIFFITHS, Roy, Gar-rad [GB/GB]; Lyncombe Court, Lyncombe Vale Road, Bath, Avon BA2 4LR (GB). <b>(74) Agents:</b> BROWN, Kenneth et al.; R.G.C. Jenkins & Co, 26 Caxton Street, London SW1H 0RJ (GB).		<b>(81) Designated States:</b> AT (European patent), AU, BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB, GB (European patent), GR (European patent), IT (European patent), JP, LU (European patent), NL (European patent), NO, SE (European patent), US.  <b>Published</b> <i>With international search report.          Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

**(54) Title:** ELECTRONIC LABELLING SYSTEM**(57) Abstract**

An elongate electronic labelling device for use in an electronic labelling system, which includes a visually continuous elongate display panel. The device presents separate data displays constituting respective labels at longitudinally spaced regions along the display panel or screen. The display panel or screen can be a single strip-like LCD panel or a plurality of strip-like LCD panels mounted end-to-end in a holder to form a continuous display.

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## ELECTRONIC LABELLING SYSTEM

This invention relates to labelling systems, and particularly, but not exclusively, to labelling systems for labelling goods carried on shelves or in elongate cabinets, for example in shops and supermarkets.

Conventionally, labels carrying information such as unit price or price per unit weight, country of origin, etc, permanently printed thereon have been disposed on the front edge of a shelf or cabinet carrying the goods. Such labels have conventionally been in the form of flexible/rectangular plastic elements held in place by engagement of upper and lower edges in respective elongate channels formed in an elongate extruded mounting strip fixed to the front edge of the shelf or cabinet. Alternatively, larger labels, carrying more information about the goods presented on the shelf or in the cabinet, may be carried on individual label holders clipped or otherwise removably secured to the shelf or cabinet edge.

A good deal of attention has been focused in recent years on applying modern technology to retail pricing systems, and the bar-code pricing system is now widely used. This system, in which each bar-coded item is optically scanned at the point of sale (till or check-out), and the price corresponding to the detected bar-

code is determined from a data store and is added to the running total, obviates the need to label each item individually, and thus produces significant labour-saving advantage over the conventional labelling systems. However, proper operation of the bar-code system depends heavily upon the accuracy of the price information displayed on the shelf, this being the only point at which price is displayed to the customer. Inconsistencies between shelf-label price and point of sale price create serious problems, particularly where the point of sale price is higher than the shelf label price; errors of this latter kind can lead to prosecution of the retailer for over-charging. To avoid these problems, it has been necessary for retailers to operate labour-intensive manual procedures for checking the accuracy of shelf labels.

In an attempt to overcome this problem of shelf labelling, it has been suggested recently to use electronic shelf labels in place of the conventional pre-printed labels mentioned earlier. These electronic labels which are attachable to the front shelf edge, include an electronic display, such as an LCD panel, and receive price information to be displayed from a central computer control, which also sends the price information to the point of sale. Electronic communication between the price label and the central computer control may be

by hard-wiring or by two-way radio link. In a known system of this kind, each electronic label is uniquely coded and incorporates its own control electronics for controlling the label display, and for communicating bar-code and price information to and from the central computer control. Each individual label is mountable on an elongate track attached to the shelf front edge, and is releasably lockable thereto. The track incorporates elongate power lines and data bus bars, and each label has a contact shoe with contacts which engage these lines.

However, it is considered that this known electronic labelling system has certain disadvantages. Firstly, as with the conventional printed labelling system, alteration of the arrangement of the goods on the shelf will necessarily involve a somewhat cumbersome procedure of unlocking and removing the relevant labels and replacing them in their new positions before reprogramming them either from the central computer control or by way of an infrared link from a hand-held control device used at the position of the shelf.

Secondly, the system, when assembled, presents an overall appearance which is visually markedly different from the conventional printed label system in which the continuous extrusion mounting the printed labels at their appropriate positions presents a smooth,

continuous and visually pleasing appearance. On the other hand, the above-mentioned known electronic shelf labelling system, when assembled, will give a broken and interrupted appearance, particularly as the individual  
5 labels are significantly wider than the track width, and project somewhat forwardly of the track.

The present invention aims to alleviate these disadvantages inherent in the known shelf labelling systems. Accordingly, in a first aspect the present  
10 invention provides an elongate electronic labelling device for use in an electronic labelling system, the device including a visually continuous elongate display panel or screen which is operable to present separate data displays constituting respective labels at  
15 longitudinally spaced regions thereof.

The labelling device is preferably adapted to be attached to the front edge of a display shelf unit, and to extend from one end to the other thereof. The device preferably comprises an elongate mounting member  
20 extruded from a suitable material, and having a cross-sectional profile enabling it to hold the elongate strip-like display panel securely in place, and to accommodate behind said panel the necessary electronic display and communication control circuitry.

25 The elongate display panel may comprise either a single strip-like display panel, eg. an LCD or other

suitable display device, or may comprise a plurality of strip-like display panels mounted end-to-end in the holder to effectively form a continuous display. The panel, or row of panels may be covered by a single, continuous transparent cover strip.

The holder may be adapted to replace the existing conventional form of printed label holder, or may alternatively be adapted to be secured onto the front of such an existing holder.

10 In accordance with a second aspect of the present invention there is provided an electronic labelling system for use in providing product information relating to products disposed on shelves comprising an elongate labelling device, the device including a visually continuous elongate display panel or screen which is operable to present separate data displays constituting respective labels at longitudinally spaced regions thereof.

20 Preferably the labelling system also includes a central processor unit for providing product information for inclusion in the data displays constituting the labels and a bar code reader. The bar code reader can be used to input product information into the central processor unit and/or to provide information relating to the location of a product.

25 In accordance with a third aspect of the present

invention there is provided a method of providing product information on products displayed on respective regions of a shelf, comprising the steps:

5 providing an electronic labelling device including a visually continuous elongate display panel or screen which is operable to present separate data displays constituting respective labels at longitudinally spaced regions thereof on product display shelves; and

10 designating the locations of products and providing signals for the generation of labels on the elongate display panel or screen at regions corresponding to the locations of the products.

The details of the electronic display control circuitry do not themselves form part of the present invention, and it is believed that it would be within the competence of a skilled electronics engineer to design the necessary electronic control system to be incorporated in the display unit, and to provide the display and control functions described below.

20 The embodiments of the present invention will now be described by way of example with reference to the accompanying drawings, in which:-

Fig. 1 is a front perspective view of an electronic labelling device in accordance with the invention, shown  
25 attached to the front edge of a shelf for displaying goods;



Fig. 2 is a front perspective view showing the abutment of two elongate shelves, each including an electronic labelling device according to the invention attached to its front edge;

5        Fig. 3 is a sectional view showing a first embodiment of the sectional structure of an electronic labelling device according to the invention, and

10       Fig. 4 is a sectional view showing a second embodiment of the sectional structure of an electronic labelling device according to the invention.

Fig. 5 is a schematic representation of a control system for generating a display on the labelling device according to the invention.

15       With reference to Figs. 1 and 2, an electronic labelling device according to the invention includes an elongate strip-like display device 1 secured to the front edge of a horizontal display shelf 2 of a display shelving system, such as a display "gondola" in a supermarket (i.e. a ticket edge display), or could be a

20       free standing device that is positioned toward the front of the shelf. The display device 1 comprises an elongate holder 3 extruded from a suitable material, eg. plastics, and having top and bottom edge flanges 4 and 5 and end pieces 6 closing off the ends of the holder.

25       Held within the holder 3 is an elongate continuous display panel 7 extending the entire length of the

holder, and therefore of the shelf 2. This display panel 7 may comprise a single elongate continuous LCD strip panel or other suitable display device, or may comprise a number of LCD strip panels disposed end-to-end in the holder. In both cases, the display is capable of alphanumeric, and possibly also pictorial display along its entire length.

The display panel or panels have a characteristic of being visible in an environment with overhead lights even if the plane of the display is displaced from the vertical. The display panels are designed to be demountable from the shelf or shelves to which they are attached for replacement or servicing.

Fig. 3 illustrates an arrangement in which the display device is adapted to be secured to an existing conventional strip label holder 10 fixed to the front edge of the shelf 2. Such a holder 10 is formed along its upper and lower edges with elongate continuous recesses 11 which would normally hold the plastic label edges. By using conventional holders to accommodate the display panels, the LCD or other displays can be replaced by non-display inserts to maintain the cosmetic appearance of the shelf, or manually produced labels when it is appropriate. Non-display and manual display inserts can, however, also be used in conjunction with other configurations of holder. The extrusion forming

the holder 3 in this embodiment is formed on its back with projections 12 which fit securely into the recesses 11. The top edge 14 of the extrusion 3 lies substantially flush with the top of the holder 10, and thus presents no unsightly projections. The cross-sectional profile of the extrusions 3 is such as to hold the display panel 7 at generally the same upward-facing orientation as the conventional labels which would be held in the holder 10.

10 This profile also includes a rear projection 15 accommodated in the space within the existing holder 10. This projection 15 accommodates a circuit board or boards 16 carrying the necessary IC processor chips 17 and other circuit components required for the control of the display on the LCD display panel 7, and for controlling communication with a remote central computer control (not shown). Such communication may be either by way of hard wiring or by radio link. In both cases it may be necessary to pass data along the length of the display device, and for this purpose a data bus bar 18 may also be accommodated within the holder 3. Power will be supplied to the electronics distributed along the length of the holder from a suitable power source, eg. one or more replaceable DC power cells fitted into the holder 3, and a DC supply bus bar may also be provided in the profile 3, running the whole length of

the device.

Fig. 4 illustrates a differently profiled extrusion to be used for the holder 3; in this case, the holder 3 replaces the conventional label holder, and to that end includes a flat rear wall 20 for engaging the front edge wall 21 of the shelf 2. Once again, the profile is adapted to mount the LCD display 7 so as to face obliquely upwardly relative to the horizontal plane of the shelf. Again, the profile of the extrusion is designed so as to accommodate the necessary IC processor chips, strip circuit boards, power lines and data bus bars.

Fig. 5 is a schematic representation of a remote system used to control display on the display panel 7 composed of a plurality of LCD display panels. The system includes a display control computer 30, a plurality of display controllers 32 that include the circuit board or boards 16 carrying IC processor chips 17 illustrated in Fig. 3, and a transmitter 34 for transmitting signals to the display controllers 32.

The display control computer 30, includes display assembly software 31 that enables displays to be composed off line, and information and graphics to be drawn from a number of sources, and a 'live' transmission area 33 that controls the transmission of signals carrying information about the image for display

on the display panel to the display controllers 32.

Each display controller 32 controls the display of an area of the LCD display panel 7. The display control computer 30 can be an industry standard personal computer operating under a normal proprietary operating system. The display control computer 30 is in communication with the store's own 'back of house computer' 36 via its serial port. The back of house computer 36 contains a master product file and pricing information for products in the store. As this pricing information is used to update the pricing data held at automatic scanning check-outs, by also using this information to update the information held by the LCD display panel 7, discrepancies between the information displayed on the shelves and the prices charged at the check-outs can be minimised.

Each display controller 32 has an unique address and is designed to identify and receive signals transmitted by the transmitter 34 from the display controller 30. The signals identified and received by individual display controllers 32 contain information for controlling the display at areas of the LCD display panel allotted to that particular display controller 32. The areas of the LCD display panel 7 allotted to a particular display controller 32 can be an area or the entire length of a single strip-like LCD display panel

located along the front of a shelf unit or one or more of a plurality of strip-like LCD display panels arranged end-to-end in a holder. Once a particular display controller 32 has received instructions transmitted by the transmitter 34, it will store the transmitted information in on-board memory. The contents of the memory are then used to control the instant display on the area of the LCD display panel 7 allocated to that particular display controller 32. The display controller 32 is provided with a hard wired low voltage d.c. supply that provides the power source for the allocated area of the LCD display 32. An on-board battery power supply is also provided for instances of power failure. Other suitable d.c. power supplies could, however, be utilised instead.

An operator creates a display at a desired location on the strip-like display device 7 of Figures 1 and 2, using graphics composition software held by the display control computer 30. The operator decides upon a shelf region for a particular product and on where in that shelf region it is desirable to provide the price information for that product. The operator then inputs the shelf address for the desired display region using a shelf address code which is recognised by the display controller 32 controlling the display at the desired shelf location and the product code for the product. If

a number of products are to be displayed each of the product codes must be entered along with an indication of the spacing of the displays along the shelf so that the labels are displayed at the desired locations. The product code for each product to be displayed at a particular shelf location, recognisable by the back of house computer 36, is included in the display to enable up-to-date product price information to be provided.

The operator can draw from graphics blocks 41 held, for example, on floppy disks for insertion into the display control computer to enhance the label-type display. The operator can manipulate the information desired for inclusion on the display to change the size and font of display characters. The system may also include prompts to the operator to include graphic blocks imported from outside the system typically on a diskette.

The system can also provide a graphic composition facility 38 to enable the operator to formulate entirely new graphics blocks. The process of creating can be achieved interactively on the screen with standard displays being achieved very quickly.

Once a desired display format or ticket edge has been achieved it is stored as a complete graphics block under a reference number. Once the operator is satisfied with the result, the completed block is moved

into the 'live' area 33 of the display control computer 30. Transmission is by secure radio transmission. The system will periodically refresh the shelf display by constantly transmitting the 'live' file of completed blocks in sequence. When a new graphics block, i.e. one that differs from the currently transmitted block, is loaded into the 'live' area 33 it will automatically be transmitted next in the transmission sequence.

It is envisaged that the display device will also incorporate elements necessary to establish communication between the processor electronics and a hand-held controller 42 used at the shelf position for the input of various information necessary to establish the alphanumeric information and/or graphics to be displayed. Commands issued by the hand-held controller 42 may also determine the exact position along the display at which the desired information is to be displayed. The hand-held controller may, for example, incorporate a bar-code reader 44 so that in setting up the shelf display, data defining the bar-code read from the product itself can be fed into and stored in the processor electronics of the display device as well as being transmitted to the central computer control. This facility will enable a manual cross-check to be made whenever desired between the stored bar-code and the bar-code read from the product displayed at the position



on the shelf corresponding to the label constituted by a data display.

It will be appreciated that the elongate continuous display device described above in accordance with the invention affords several important advantages, including the following:

1. a visually pleasing appearance;
2. great flexibility of choice of position of data "labels" along the length of the shelf;
3. flexibility of choice of size of labels. For example, where a particular product is to occupy an extended part of the shelf, a label can be repeated along the corresponding length of the display device, or additional information or promotional wording and/or graphics could be displayed alongside or between the labels.

CLAIMS:

1. An elongate electronic labelling device for use in an electronic labelling system, the device including a visually continuous elongate display panel or screen  
5 which is operable to present separate data displays constituting respective labels at longitudinally spaced regions thereof.
2. An elongate electronic labelling device according to claim 1 wherein the labelling device is adapted to be  
10 attached to the front edge of a display shelf or unit, and to extend from one end to the other thereof.
3. An elongate electronic labelling device according to claim 1 wherein the labelling device is adapted to be freestanding.
- 15 4. An elongate electronic labelling device according to any one of claims 1 to 3 wherein the device comprises an elongate mounting member extruded from a suitable material, and having a cross-sectional profile enabling it to hold the elongate strip-like display panel  
20 securely in place, and to accommodate behind said panel electronic display and communication control circuitry.

5. An elongate electronic labelling device according to any one of claims 1 to 4 wherein the display panel comprises a single strip light display panel.

5 6. An elongate electronic display device according to any one of claims 1 to 4 wherein the display panel is a liquid crystal display panel.

7. An elongate electronic labelling device according to any one of claims 1 to 4 wherein the elongate display panel comprises a plurality of strip-like liquid crystal display panels mounted end-to-end in the holder to effectively form a continuous display.

10

8. An elongate electronic labelling device according to any one of claims 1 to 7 wherein the display panel is covered by a single continuous transparent cover strip.

15 9. An electronic labelling system for use in providing product information relating to products disposed on shelves comprising an elongate labelling device, the device including a visually continuous elongate display panel or screen which is operable to present separate data displays constituting respective labels at

20 longitudinally spaced regions thereof.

10. An electronic labelling system according to claim 9 further comprising a central processor unit for providing product information for inclusion in the data displays constituting the labels.

5 11. An electronic labelling system according to claim 10 further comprising a bar code reader for inputting product information into the central processor unit.

10 12. An electronic labelling system according to claim 11 wherein the bar code reader further provides information relating to the product location to the central processing unit.

13. A method of providing product information on products displayed on respective regions of a shelf, comprising the steps:

15 providing an electronic labelling device including a visually continuous elongate display panel or screen which is operable to present separate data displays constituting respective labels at longitudinally spaced regions thereof on product display shelves; and

20 designating the locations of products and providing signals for the generation of labels on the elongate display panel or screen at regions corresponding to the locations of the products.

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Fig. 1.

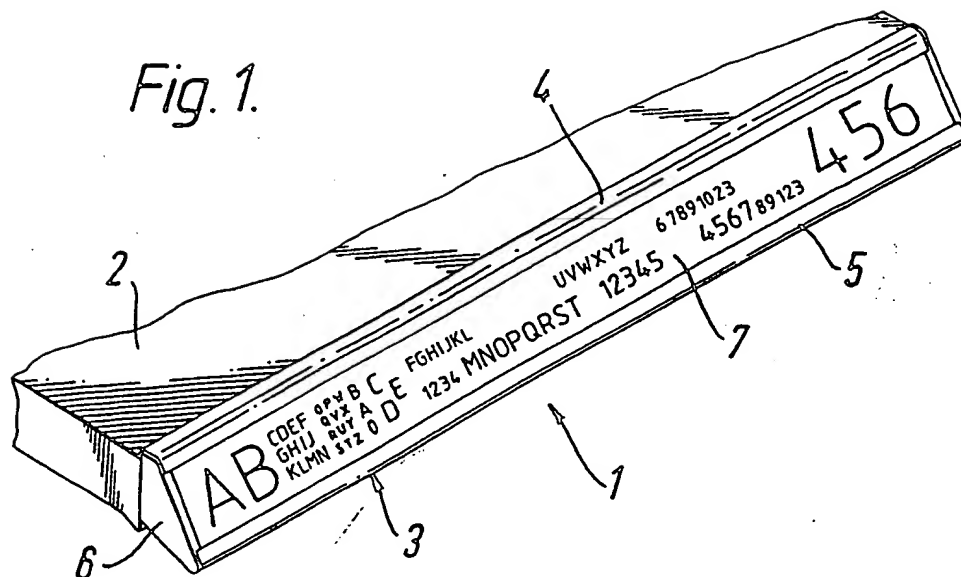
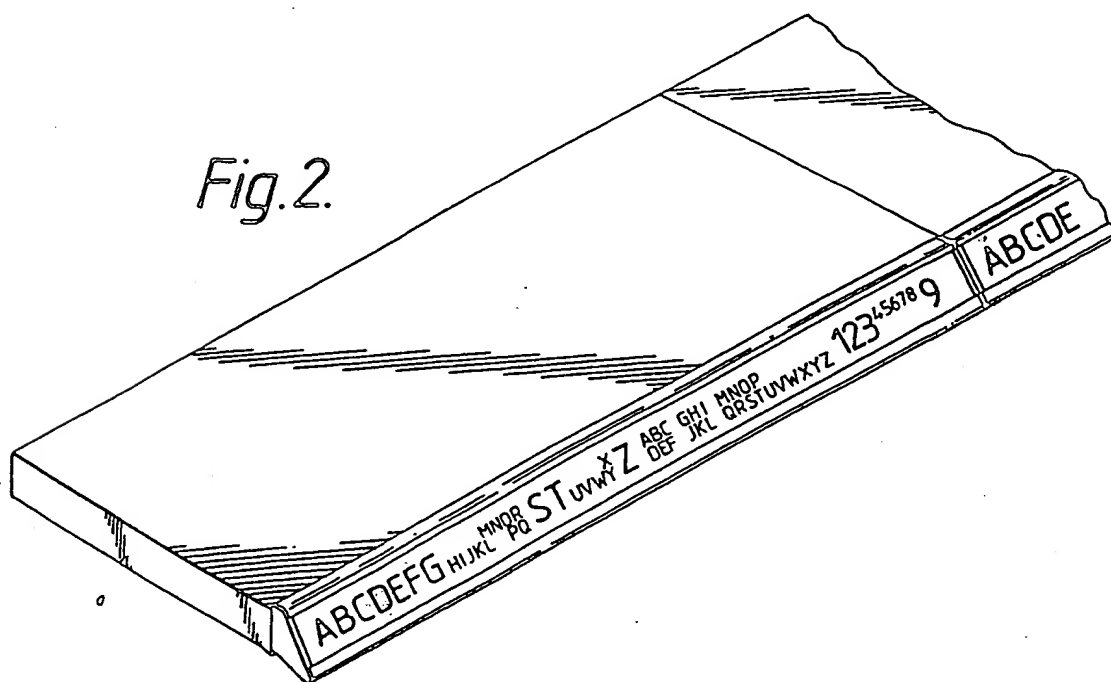


Fig. 2.



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Fig.3.

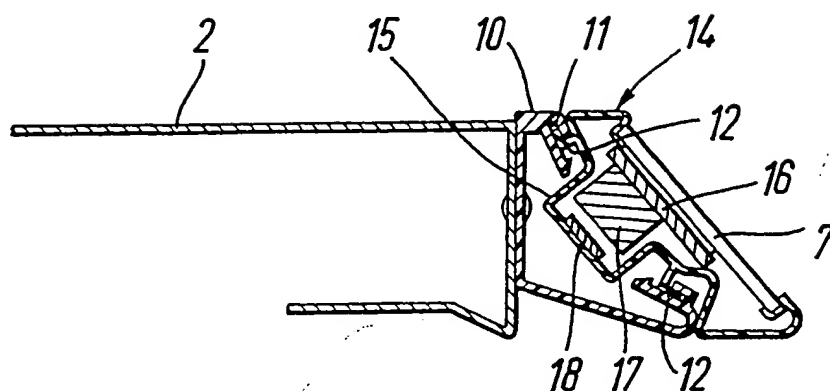
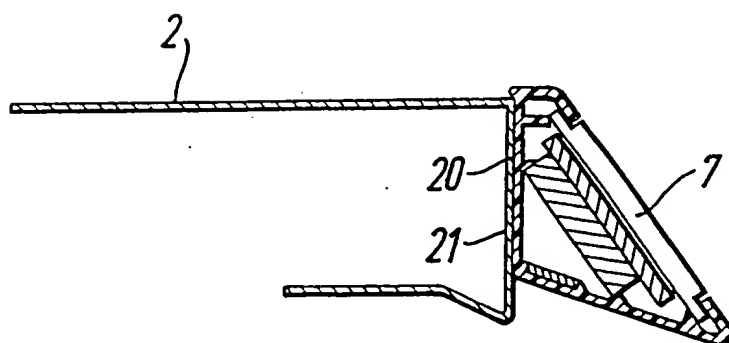
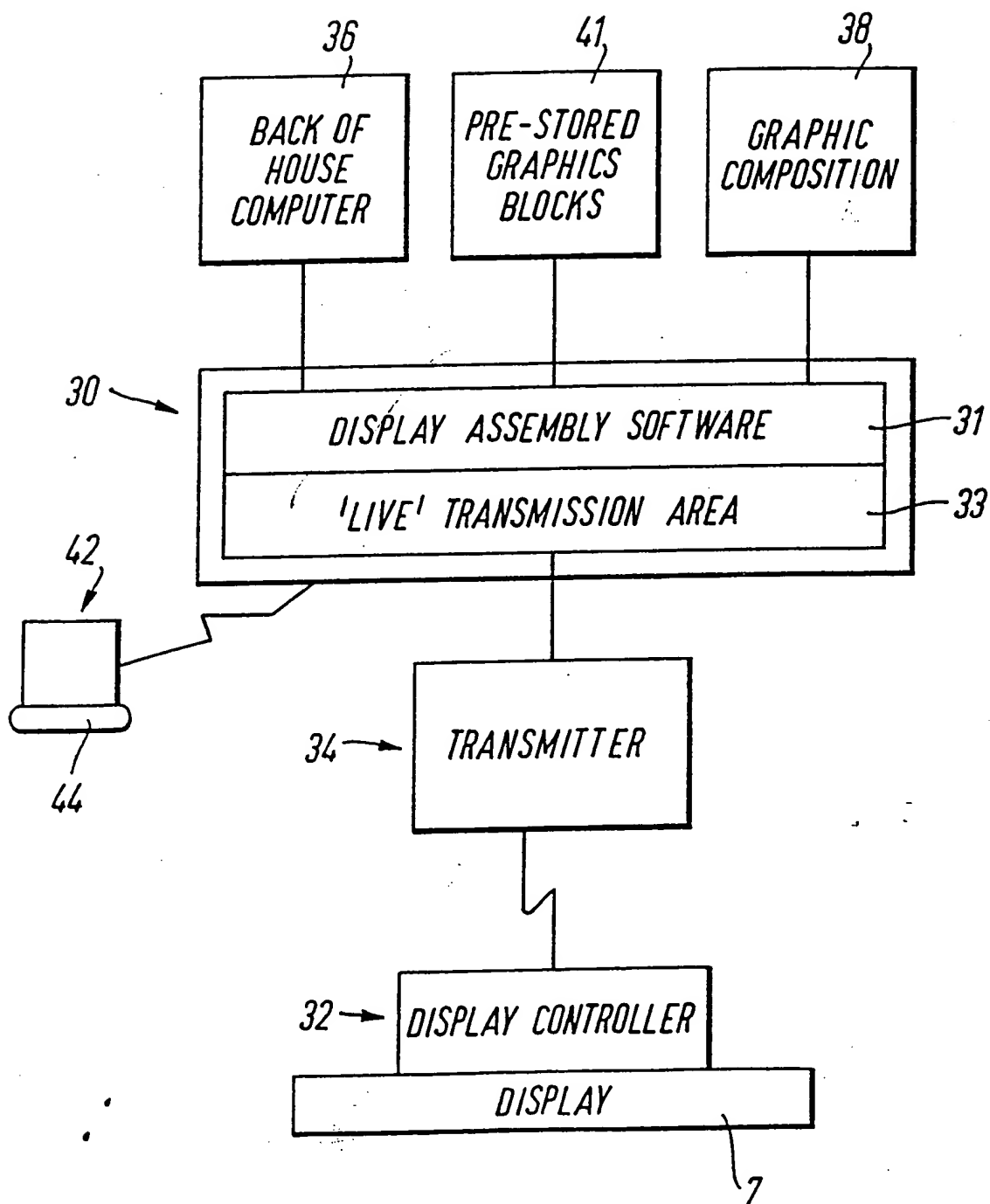


Fig.4.



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Fig. 5.



SUBSTITUTE SHEET

# INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 91/02038

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup> According to International Patent Classification (IPC) or to both National Classification and IPC <b>IPC5: G 09 F 9/30, G 06 F 15/21, G 07 G 1/14</b>																				
<b>II. FIELDS SEARCHED</b> <div style="text-align: right; margin-right: 100px;">Minimum Documentation Searched<sup>7</sup></div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%; border-bottom: 1px solid black;">Classification System</th> <th style="border-bottom: 1px solid black;">Classification Symbols</th> </tr> <tr> <td style="padding: 5px;">IPC5</td> <td style="padding: 5px;">G 09 F, G 06 F, G 07 G, A 47 F</td> </tr> </table> <div style="text-align: center; margin-top: 5px;">Documentation Searched other than Minimum Documentation to the extent that such Documents are Included in Fields Searched<sup>8</sup></div>			Classification System	Classification Symbols	IPC5	G 09 F, G 06 F, G 07 G, A 47 F														
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IPC5	G 09 F, G 06 F, G 07 G, A 47 F																			
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; padding: 5px;">Category *</th> <th style="width: 60%; padding: 5px;">Citation of Document,<sup>11</sup> with indication, where appropriate, of the relevant passages<sup>12</sup></th> <th style="width: 30%; padding: 5px;">Relevant to Claim No.<sup>13</sup></th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">WO, A1, 8806773 (ORDONEZ ET AL) 7 September 1988, see page 15, line 2 - line 27; figure 5</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1-2, 5-10, 13</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="text-align: center; vertical-align: top; padding: 5px;">--</td> <td style="text-align: center; vertical-align: top; padding: 5px;">3-4, 11-12</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">DE, A1, 3135028 (BIZERBA-WERKE WILHELM KRAUT GMBH &amp; CO KG) 7 April 1983, see the whole document</td> <td style="text-align: center; vertical-align: top; padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">EP, A2, 0396414 (PRICELINK, INC.) 7 November 1990, see page 3, line 40 - line 54; figures 2A, 2B</td> <td style="text-align: center; vertical-align: top; padding: 5px;">4</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;"></td> <td style="text-align: center; vertical-align: top; padding: 5px;">--</td> <td></td> </tr> </tbody> </table>			Category *	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>	X	WO, A1, 8806773 (ORDONEZ ET AL) 7 September 1988, see page 15, line 2 - line 27; figure 5	1-2, 5-10, 13	Y	--	3-4, 11-12	Y	DE, A1, 3135028 (BIZERBA-WERKE WILHELM KRAUT GMBH & CO KG) 7 April 1983, see the whole document	3	Y	EP, A2, 0396414 (PRICELINK, INC.) 7 November 1990, see page 3, line 40 - line 54; figures 2A, 2B	4		--	
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<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><b>* Special categories of cited documents:<sup>10</sup></b></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 48%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p> </div> </div>																				
<b>IV. CERTIFICATION</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;">           Date of the Actual Completion of the International Search   <b>28th January 1992</b> </td> <td style="width: 50%; padding: 5px; vertical-align: top;">           Date of Mailing of this International Search Report   <b>17. 03. 92</b> </td> </tr> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;">           International Searching Authority   <b>EUROPEAN PATENT OFFICE</b> </td> <td style="width: 50%; padding: 5px; vertical-align: top;">           Signature of Authorized Officer   <b>Natalie Weinberg</b> </td> </tr> </table>			Date of the Actual Completion of the International Search  <b>28th January 1992</b>	Date of Mailing of this International Search Report  <b>17. 03. 92</b>	International Searching Authority  <b>EUROPEAN PATENT OFFICE</b>	Signature of Authorized Officer  <b>Natalie Weinberg</b>														
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
Y	EP, A2, 0200473 (FORDS OF BRISTOL LIMITED) 5 November 1986, see abstract; figures 2,3  --	4
Y	US, A, 4766295 (M.H. DAVIS ET AL) 23 August 1988, see column 4, line 17 - line 28; figure 1  --	11-12
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# ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. PCT/GB 91/02038

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.  
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